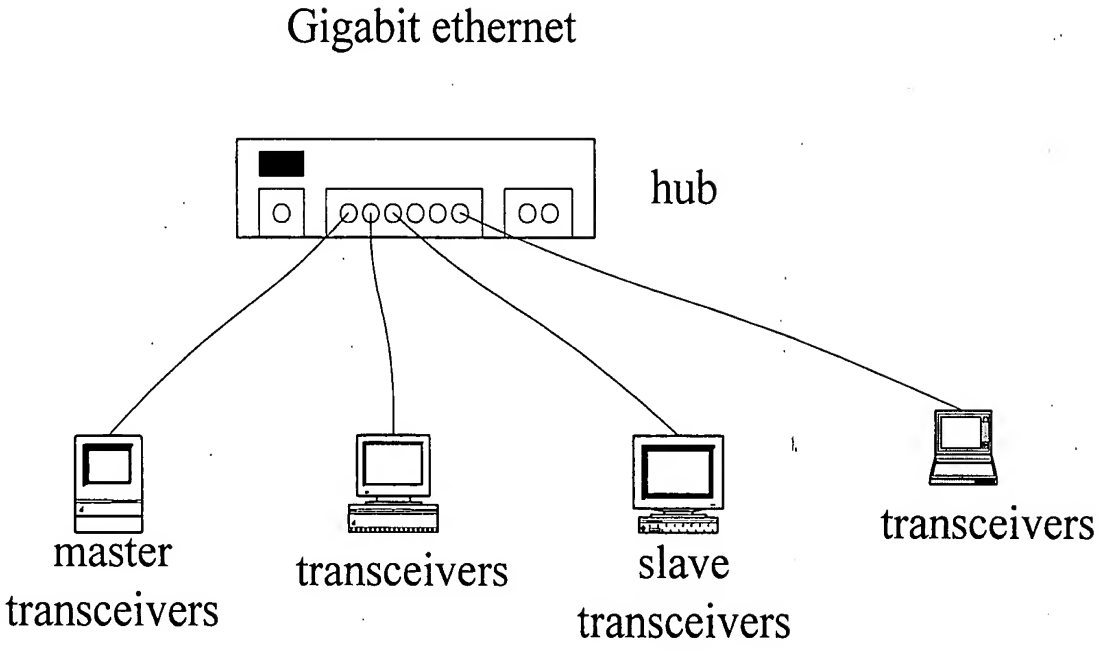

Gigabit ethernet
hub
master
transceivers
transceivers
slave
transceivers
transceivers

FIG. 1A

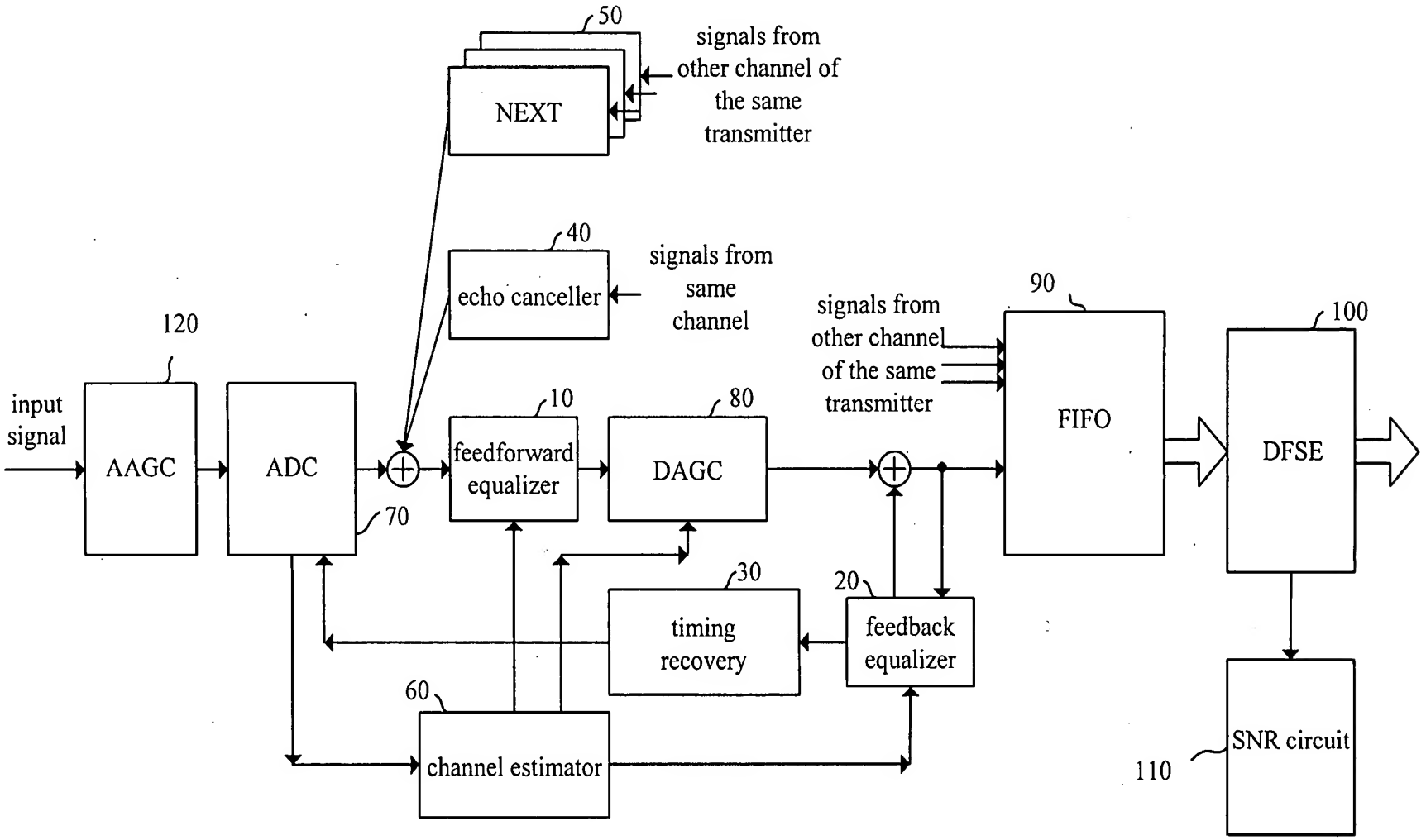
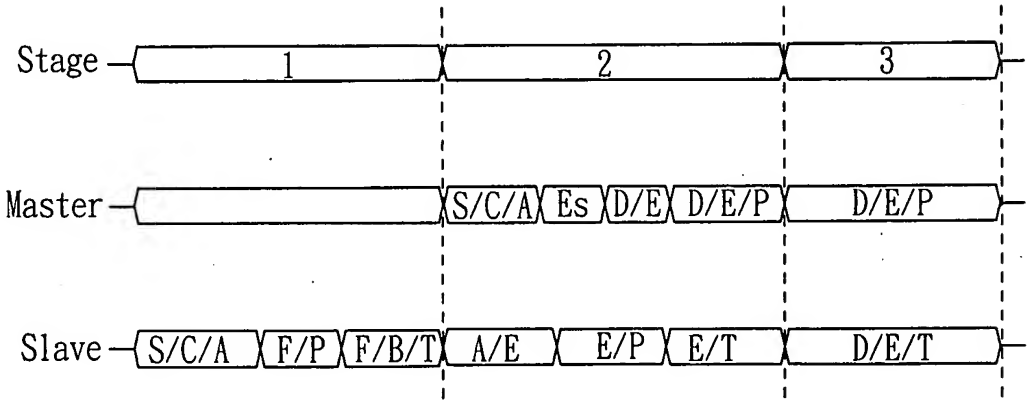

50
signals from other channel of the same transmitter
NEXT
40
signals from same channel
echo canceller
120
input signal
AAGC
ADC
70
10
feedforward equalizer
80
DAGC
signals from other channel of the same transmitter
90
FIFO
100
DFSE
30
timing recovery
20
feedback equalizer
60
channel estimator
SNR circuit
110

FIG. 1B



S : Signal Detection

F : FFE

B : FBE

D : FFE + FBE

P : Phase Loop of Timing Recovery

T : Frequency Loop and Phase Loop of Timing Recovery

E : Echo and NEXT Loop

C : Chennel Estimation

Es : Echo Estimation

A : AAGC

FIG. 2

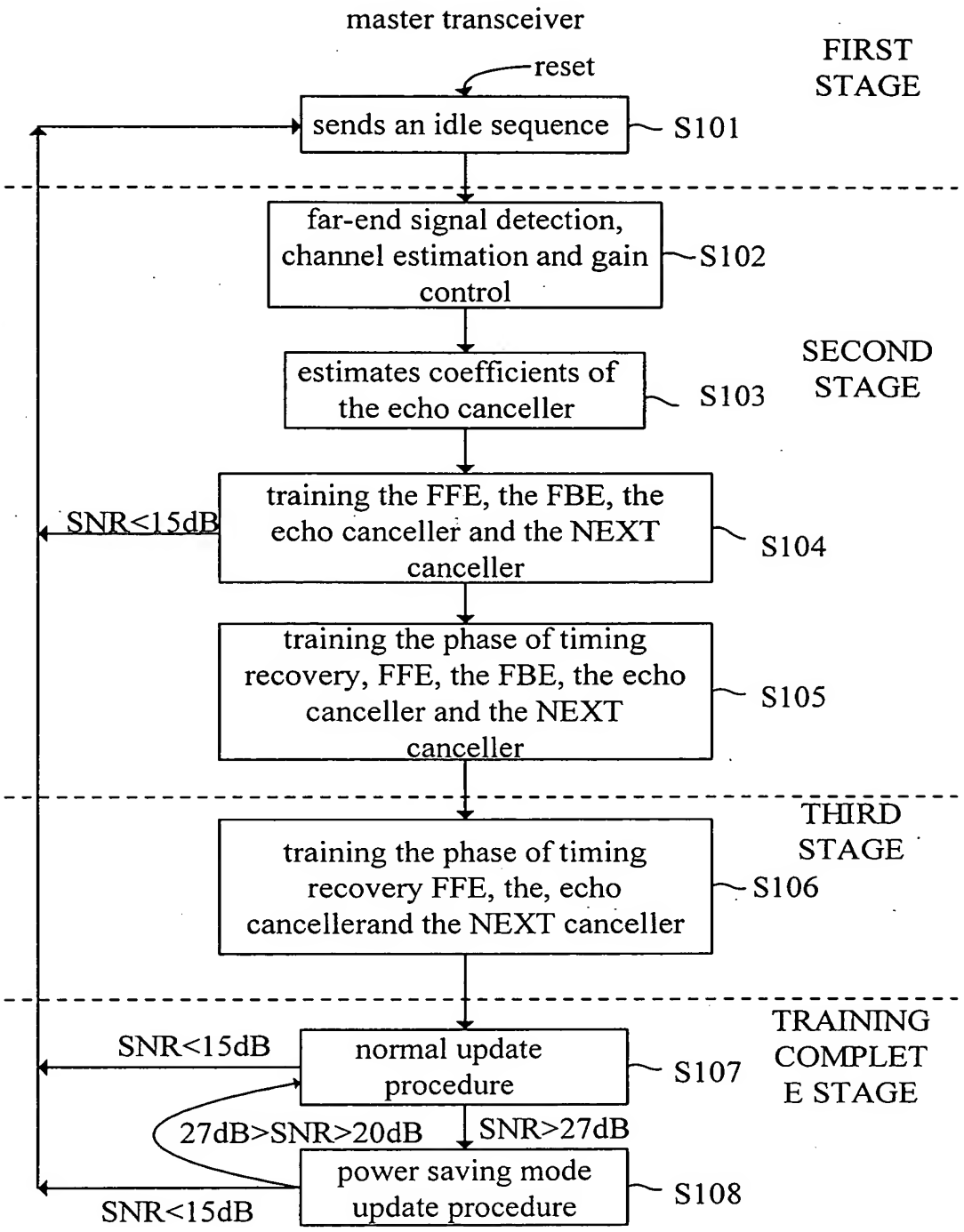

master transceiver
FIRST STAGE
reset
sends an idle sequence
S101
far-end signal detection, channel estimation and gain control
S102
SECOND STAGE
estimates coefficients of the echo canceller
S103
SNR<15dB
training the FFE, the FBE, the echo canceller and the NEXT canceller
S104
training the phase of timing recovery, FFE, the FBE, the echo canceller and the NEXT canceller
S105
THIRD STAGE
training the phase of timing recovery FFE, the, echo cancellerand the NEXT canceller
S106
TRAINING COMPLET E STAGE
SNR<15dB
normal update procedure
S107
27dB>SNR>20dB
SNR>27dB
power saving mode update procedure
S108
SNR<15dB

FIG. 3

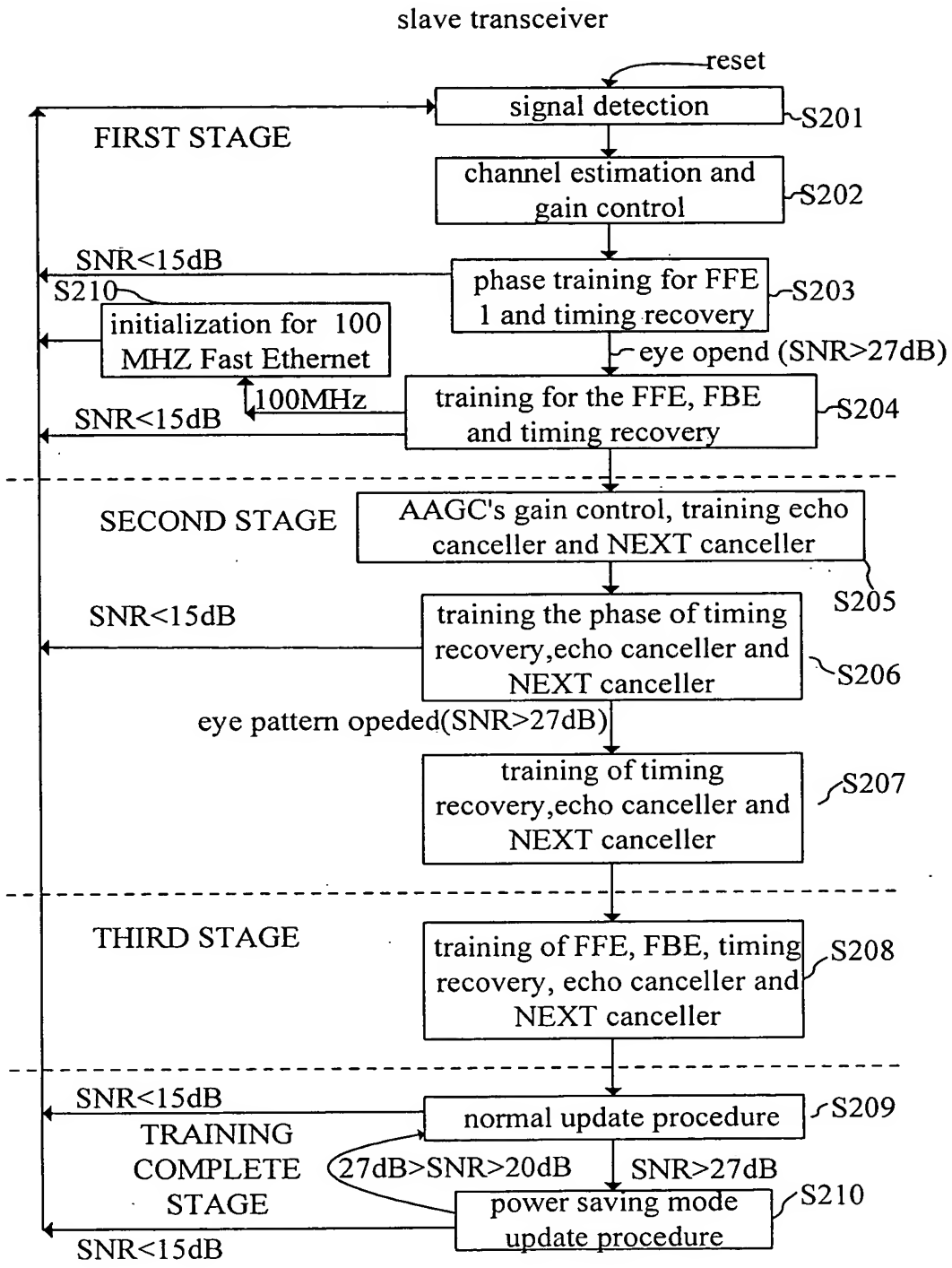

slave transceiver
reset
signal detection
S201
FIRST STAGE
channel estimation and gain control
S202
SNR<15dB
S210
phase training for FFE 1 and timing recovery
S203
initialization for 100 MHZ Fast Ethernet
eye opend (SNR>27dB)
100MHz
training for the FFE, FBE and timing recovery
S204
SNR<15dB
SECOND STAGE
AAGC's gain control, training echo canceller and NEXT canceller
S205
SNR<15dB
training the phase of timing recovery,echo canceller and NEXT canceller
S206
eye pattern opeded(SNR>27dB)
training of timing recovery,echo canceller and NEXT canceller
S207
THIRD STAGE
training of FFE, FBE, timing recovery, echo canceller and NEXT canceller
S208
SNR<15dB
normal update procedure
S209
TRAINING COMPLETE STAGE
27dB>SNR>20dB
SNR>27dB
power saving mode update procedure
S210
SNR<15dB

FIG. 4

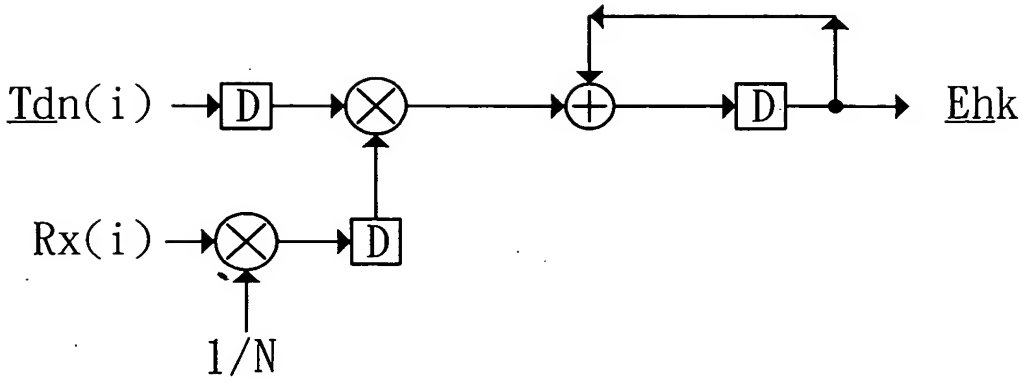


FIG. 5

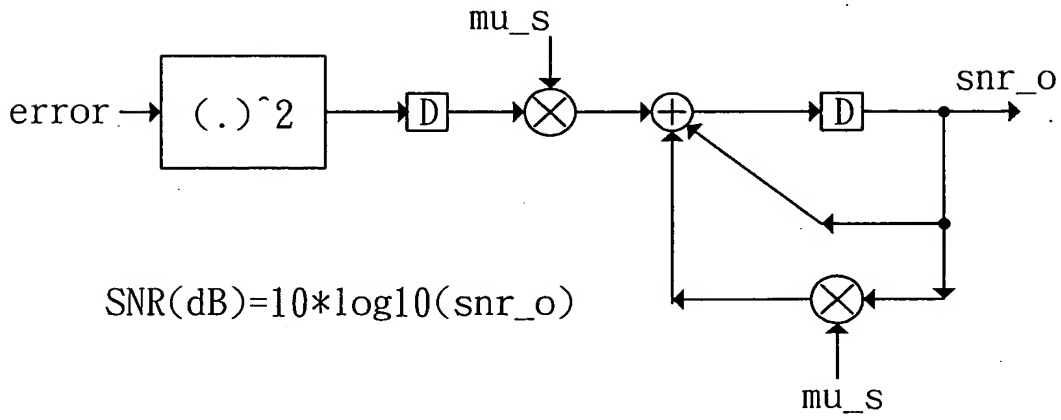


FIG. 6